

Workshop on Single Particle Reconstructions And Visualization

Scientific Animation

Tutorial

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Scientific Animation

- Preliminary
- Iris Explorer basics
- SAIL basics

Preliminary

Survey

1. How many are familiar with LINUX?
2. How many are familiar with Iris Explorer?
3. How many are using other viz packages?
4. How many program in C, C++, or Fortran?
5. How many have datasets for Sunday?

Preliminary Disclaimer

- Developed for SGI
- Lab is running with Linux Red Hat 8.0
- Iris Explorer 5.0 tested against 6.1 => 7.3
- Alpha version of explorer on RH 8
- Alpha version of SAIL on Linux
- MPEG compression does not work under Linux

- For our lawyers, who have microscopes:

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Preliminary

Getting started

1. Login

- Account = baylor
- Password = jkl06\$

2. Type the following:

```
tssh
```

```
mount /data
```

```
ls -l /data/viz/update
```

```
source /data/viz/update
```

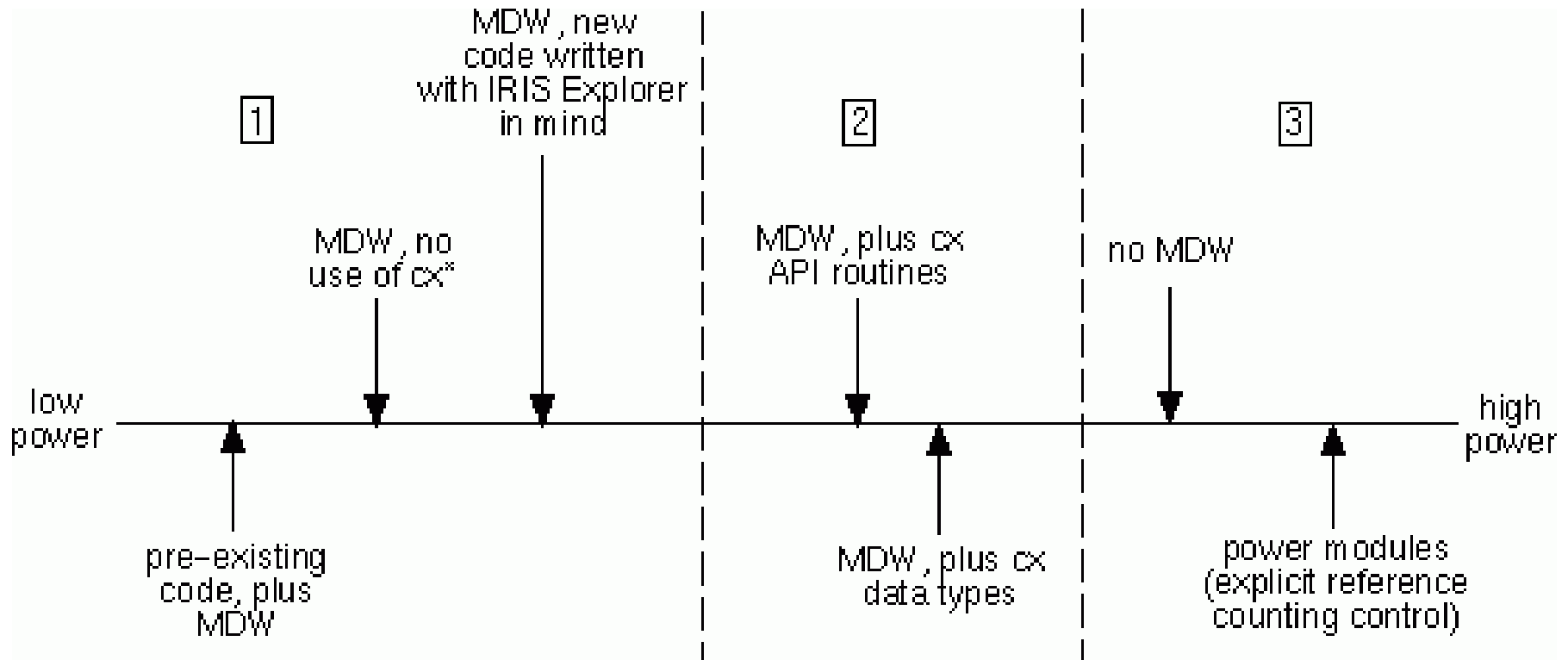
```
cp /data/viz/programs/* /usr/explorer/SAIL/templates/programs
```

```
ls -l /usr/explorer/SAIL/templates/programs
```

Iris Explorer Basics

- Spectrum of use
- Critical files and directories
- Documentation
- Data structures
- Shared memory & parallel processing
- Running “explorer”
- Running “mbuilder”
- Installation issues

Spectrum of use



Critical files & directories

EXPLORERHOME

- /usr/explorer
- /usr/explorer/Explorer.config
- /usr/explorer/sample.cshrc

EXPLORERUSERHOME

- ~/.explorerrc
- ~/explorer
- ~/.cshrc

Documentation

`/usr/explorer/docs/html/index.htm`

Data structures

- Parameter (text, integer, float)
- Lattice (n-dimensional, coordinates)
- Geometry (openInventor, OpenGL)
- Pick (interactive, point, normals, camera)

Shared memory & parallel processing

- 32 bit addressing
- Shared memory max=512MB
- Each module has access to it
- Each module is an independent process
- Max number of modules is 64
- Each process has a 2GB memory space
- Potential memory is over 60 GB

Iris Explorer Basics

Running “explorer”

- Map editor
- Librarian
- NAG provided modules
- Modules (input/output, control, widgets)
- Map examples

Iris Explorer Basics

Running “mbuilder”

- Go to the directory with the source code
- Start mbuilder
- Define inputs/outputs
- Create source code hooks
- Create widgets
- Build & install

SAIL Basics

- Files and directories
- Installation procedures
- SAIL manager
- Projects/templates/modules managers
- Example: LDL
- Animation suite

SAIL Basics

files & directories

- /usr/explorer/SAIL
- /usr/explorer/SAIL/src
- /usr/explorer/SAIL/modules*

- ~/sail
- ~/sail/projects
- ~/sail/projects/0000/config
- ~/sail/projects/0000/frames

- ~/sail/mpeg

SAIL Basics

Installation procedures

- Gunzip/untar file
- Start explorer
- Start SAIL_INSTALL
- In the SAIL source tree=> build mode
- Out of the SAIL source tree=> install mode
you need write access to /usr/explorer

SAIL Basics

managers

- SAIL launches other modules
- Accesses explorer documentation
- Projects
- Templates
- Modules, for display management

SAIL Basics

Example: LDL

- Isosurface
- Stereolimages
- BoxCrop
- LatCoord/ColorSurface
- LatCoord/LatCut

SAIL Basics

Example: HSV_vp5

- Pdb atoms
- Pdb backbone
- Pdb filter
- Pdb residue
- Pdb EDM
- SoTransform
- GeoBuilder

SAIL Basics

Animation

- Scripting
- Examples
- Problems/future

SAIL Basics

scripts

- Initial conditions
- Camera control
- Event control
- Geometry control

- Spreadsheet layout
- First two columns => time

absolute + frame/fps

SAIL Basics

scripts/initial conditions

- #SAIL_SCRIPT version=1
- #
- IC.startTime
- IC.stopTime

SAIL Basics

scripts/camera control

- t f SoCamera->readFile KEYFRAME=1
- t f SoCamera.orientation.ROLL 0
- t f SoCamera.orientation.PITCH 0
- t f SoCamera.orientation.YAW 0

- 10 0 SoCamera.orientation.ROLL 0
- 20 0 SoCamera.orientation.ROLL 90

SAIL Basics

scripts/event control

- t f Event.char.ID 0 some text string
- t f Event.int.ID 0 1776
- t f Event.float.ID 0 3.1415

- 0 0 Event.char.ID 0 the rain in Spain
- 2 0 Event.char.ID 0 falls gently on

- 0 0 Event.int.ID 1 0
- 5 0 Event.int.ID 1 5
- 5 1 Event.int.ID 1 0

- 0 0 Event.float.ID 0 0
- 10 -1 Event.float.ID 0 3.1415

SAIL Basics

scripts/geometry control

- t f SoNode->readfile 0 NULL
- t f SoNode->readfile 0 ./someFile.iv
- t f SoTransform.center.file 0 ./anotherFile.iv

- t f SoMaterial.diffuse 0 .5 .5 .5
- t f SoMaterial.transparency 0 .25
- t f SoMaterial.specular 0 .5 .5 .5
- t f SoMaterial.shininess 0 1

- t f SoTransform.translation 0 0 0 0
- t f SoTransform.rot.ROLL 0 0
- t f SoTransform.rot.PITCH 0 0
- t f SoTransform.rot.YAW 0 0

SAIL Basics

Example: animations

- LDL
- HSV PDB & EM
- RDV

SAIL Basics

Review of SAIL modules

- Data readers
- Render
- Isosurface
- BoxCrop
- SoMaterial
- Colorsurface
- SoTransform
- LatCoord
- GenerateColormap
- ReadCLUT
- SAIL
- SAIL_INSTALL
- Projects
- Templates
- Modules
- PDB suite
- Inventor suite
- Animation suite

Known problems & future solutions

- Shared memory garbage collection
- Open Inventor transcribe
- Stereo graphics
- Polygons & transparencies
- Proprietary data files
- Shutdown cleanup

- HDF for data management
- Spaceball manager for better interface
- Integration with python

TO GET A COPY

- IRIS explorer www.nag.com
 - » Available on Linux & SGI
 - » Cost \$750-\$1000

- SAIL matthewd@bcm.tmc.edu
 - » Available on SGI
 - » Soon to available on Linux
 - » free